# The Effect of the Chemical Structure of Polyfluorinated Alcohols on the Tribological Properties of Poly-e-Caproamide

**A. P. Krasnov[a], N. A. Storozhakova[b], V. B. Bazhenova[a], O. V. Afonicheva[a], A. V. Naumkin[a], Ya. V. Zubavichus[a], I. A. Rashkovan[c], M. E. Kazakov[c], and I. A. Novakov[b]**

[a] *Nesmeyanov Institute of Element-Organic Compounds, Russian Academy of Sciences, ul. Vavilova 28, Moscow, 117813 Russia*

[b] *Volgograd State Technical University, pr. Lenina 28, Volgograd, 400131 Russia*

[c] *J.S. Co. "Carbon Fiber Materials and Composites" (UVIKOM), ul. Kolontsova 5, Moskovskaya oblast, Mytishchi, 141009 Russia*

Received July 30, 2007

**Abstract**—The paper presents investigation results of tribological properties of model poly-ε-caproamide compositions modified by 0.1 wt % polyfluorinated alcohols of the formula $H(CF_2CF_2)_nCH_2OH$, where $n$ = 1–3. The methods of X-ray photoelectron spectroscopy, X-ray diffraction analysis, the determination of the limiting wetting angle and microhardness, and thermomechanical analysis were used in this work. The plasticizing role of polyfluorinated alcohols and the orientation effect of poly-ε-caproamide most expressed in the compositions of polyfluorinated alcohol with $n$ = 1 have been established. The modified poly-ε-caproamide displays by far a lower friction coefficient and a higher wear resistance as compared to the original one. The increased amount of $–CF_2–CF_2–$ groups in the alcohol molecules exerts an advantageous effect on improving the tribooxidative stability of the modified poly-ε-caproamide.

**DOI:** 10.3103/S1068366608010078

**Key words**: polyfluorinated alcohols, poly-ε-caproamide, friction, wear, plasticization, orientation effect, tribooxidation.